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FLUORESCENCE AND LIGHT SCATTERING OF AEROSOL PARTICLES. (U)  
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20. ABSTRACT CONTINUED

in turn depend upon the morphology and optical properties of the particles. In the case of certain metals, such as silver and gold, resonances may occur which give rise to the newly recognized phenomenon of surface enhanced Raman scattering (SERS). Theoretical studies have been carried out for spheres, concentric spheres, spheroids, and cylinders. Experimental studies have been carried out for fluorescent molecules embedded within polystyrene latex particles and for Raman scattering molecules adsorbed at the surface of colloidal silver particles.

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### Statement of Problem Studied:

The studies carried out during the period of this grant have responded mainly to the query: How is the Raman or fluorescent scattering affected when the active molecules are embedded within dielectric particles or are adsorbed at the outer surface of either dielectric or metallic particles.

### Summary of Most Important Results:

There is a strong effect because the molecules are excited by the local electromagnetic fields which in turn depend upon the morphology and optical properties of the particles. In the case of certain metals, such as silver and gold, resonances may occur which give rise to the newly recognized phenomenon of surface enhanced Raman scattering (SERS). Theoretical studies have been carried out for spheres, concentric spheres, spheroids, and cylinders. Experimental studies have been carried out for fluorescent molecules embedded within polystyrene latex particles and for Raman scattering molecules adsorbed at the surface of colloidal silver particles. Detailed results may be found in the following publications.

### List of Publications:

1. S.D. Druger, M. Kerker, D.-S. Wang and D.D. Cooke, Light Scattering by Inhomogeneous Particles, Appl. Opt. 18, 3888 (1979).
2. H. Chew, D.D. Cooke and M. Kerker, Raman and Fluorescent Scattering by Molecules Embedded in Dielectric Cylinders, Appl. Opt. 19, 44 (1980).
3. M. Kerker, D.-S. Wang, H. Chew and D.D. Cooke, Does Lorenz-Mie Scattering Theory for Active Particles Lead to a Paradox? Appl. Opt. 19, 1231 (1980).
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5. M. Kerker, D.-S. Wang and H. Chew, An Optical Model for Fluorescence of Mammalian Sperm in Flow Cytometry, Cytometry 1, 161 (1980).
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List of Publications continued:

7. M. Kerker, D.-S. Wang and H. Chew, Surface Enhanced Raman Scattering (SERS) by Molecules Adsorbed at Spherical Particles, Appl. Opt. 19, 3373 (1980). (Errata: Appl. Opt. 19, 4159 (1980)).
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